CLAIMS

1. A method of reading data from a storage disk having a multiplicity N of sectors by use of a storage disk drive that includes serial data transfer means and buffer means, said method comprising:

a step of allocating common buffer spaces of said buffer means to sectors 1 through K (K<N) of said storage disk, where K is a predetermined integer, and allocating individual buffer spaces of said buffer means to sectors (K+1) through N of said storage disk;

a sequence of steps repeated for each of said N sectors in response to a read request, said sequence including steps of

(i) determining the sector to be read next (the sector hereinafter referred to as next readable sector) based on the current rotational position of said storage disk,

(ii) reading data from said next readable sector,

(iii) storing said data read from said next readable sector in the buffer space allocated to said next readable sector, and

(iv) setting a flag (referred to as unprocessed status flag) indicative of said data stored being unprocessed for the sector whose data has been stored in its associated buffer space; and

a sequence of steps also repeated for each of said N sectors in the order of the sectors, starting with sector 1, in response to said read request, said sequence including steps of

(v) transferring data, via said serial data transfer means, from a buffer space allocated to an associated sector to an external device, on condition that an unprocessed status flag is set for that sector, and

(vi) clearing the flag for the sector whose data has been

transferred from its associated buffer space.

2. The method of reading data from a storage disk according to claim 1, wherein in the initial stage of a read operation, said next readable sector determined in said step (i) is the sector K+1 if the rotational position of said storage disk lies within the range from sector 1 through sector K, while the next readable sector is the sector next to the one currently located at the rotational position of said storage disk if said rotational position has passed sector K.

3. The method of reading data from a storage disk according to claim 1, wherein in the initial stage of a read operation if, in step (iii) of storing (or buffering) data of a sector in an associated buffer space, said data belongs to one of sectors 1 through K, then buffering said data is skipped to start sequential buffering with sector K+1.

4. The method of reading data from a storage disk according to claim 1, wherein

said next readable sector determined in said step (i) is the sector next to the one at the rotational position of said storage disk irrespective of the sector number of said sector located at said rotational position in the initial stage of a read operation, and

said data is stored (buffered) in an associated buffer space in step (iii) in the initial stage of the read operation, irrespective of the number of the sector read in step (ii).

5. The method of reading data from a storage disk according to claim 1,

wherein

the next readable sector determined in said step (i) is the sector next to the one located at the rotational position of said storage disk, and

all the flags for the sectors associated with the same buffer spaces as said next readable sector are cleared in step (iv) if said next readable sector belongs to sectors 1 through K.

6. The method of reading data from a storage disk according to claim 1, wherein said common buffer spaces include at least two buffer spaces together forming a ring buffer.

7. A method of writing data to a multiplicity N of sectors of a storage disk using a storage disk drive that includes serial data transfer means and buffer means, said method comprising:

a step of allocating individual buffer spaces of said buffer means to the sectors 1 through J (J<N) of said storage disk, where J is a predetermined integer, and allocating common buffer spaces of said buffer means to sectors J+1 through N of said storage disk;

a sequence of steps repeated for each of said N sectors in the order of the sectors, starting with sector 1, in response to a write request, said sequence including steps of

(vii) storing the data received from an external device via said serial data transfer means in an associated buffer space, on condition that the unprocessed status flag has been cleared for the sector associated with said buffer space, and

(viii) setting an unprocessed status flag for the sector

whose data has been stored in its associated buffer;

a sequence of steps repeated for each of said N sectors in response to said write request, said sequence including steps of

(ix) determining the next writable sector based on the rotational position of said storage disk,

(x) writing data in said next writable sector, on condition that an unprocessed status flag is set for said next writable sector, and

(xi) clearing the flag for the sector to which data has been written.

8. The method of writing data to a storage disk according to claim 7, wherein said next writable sector determined in said step (ix) is the sector next to the one located at the rotational position.

9. The method of writing data to a storage disk according to claim 7, wherein said common buffer spaces include at least two buffer spaces together forming a ring buffer.

10. A storage disk control unit, comprising:

serial data transfer means;

buffer means;

storage disk control means;

a buffer management table for establishing correspondence between a multiplicity N of sectors of a storage disk and a group of buffer spaces of said buffer means including common buffer spaces and individual buffer spaces; and

a CPU, connected to each of said serial data transfer means,

buffer means, storage disk control means, and buffer management table, for controlling these means and said buffer management table, wherein

(1) in a read operation, said CPU is adapted to

set said buffer management table such that said common buffer spaces of said buffer means are allocated to the first K sectors (K<N), where K is a predetermined integer, and individual buffer spaces of said buffer means are allocated to sectors K+1 through N;

repeat a sequence of steps for each of said N sectors in response to a read request, said sequence including steps of

(i) determining the sector to be read next (next readable sector) based on the current rotational position of said storage disk,

(ii) reading data from said next readable sector,

(iii) storing (buffering) said data read in step (ii) in the buffer space allocated to said next readable sector, and

(iv) setting an unprocessed status flag indicative of said stored data being unprocessed for the sector whose data has been stored in its associated buffer space,

repeat a sequence of steps for each of said N sectors in the order of the sectors starting with sector 1, in response to said read request, said sequence including steps of

(v) transferring data, via said serial data transfer means, from a buffer space allocated to a sector to an external device, on condition that an unprocessed status flag is set for that sector, and

(vi) clearing the flag for the sector whose data has been transferred from its associated buffer space;

(2) in a write operation, said CPU is adapted to

set said buffer management table such that said individual

buffer spaces of said buffer means are allocated to sectors 1 through J (J<N), where J is a predetermined integer, and said common buffer spaces of said buffer means are allocated to sectors J+1 through N;

repeat a sequence of steps for each of said N sectors in the order of the sectors starting with sector 1, in response to a write request, said sequence including steps of

(vii) storing the data received from an external device via said serial data transfer means in a buffer space allocated to a sector, on condition that an unprocessed status flag has been cleared for that sector, and

(viii) setting an unprocessed status flag for the sector whose data has been stored in its associated buffer;

repeat a sequence of steps for each of said N sectors in response to said write request, said sequence including steps of

(ix) determining the next writable sector based on the current rotational position of said storage disk,

(x) writing data to said next writable sector, on condition that an unprocessed status flag is set to said next writable sector, and

(xi) clearing the flag for the sector to which said data has been written.

11. The storage disk control unit according to claim 10, wherein said numbers K, J, and N satisfy J=N-K.